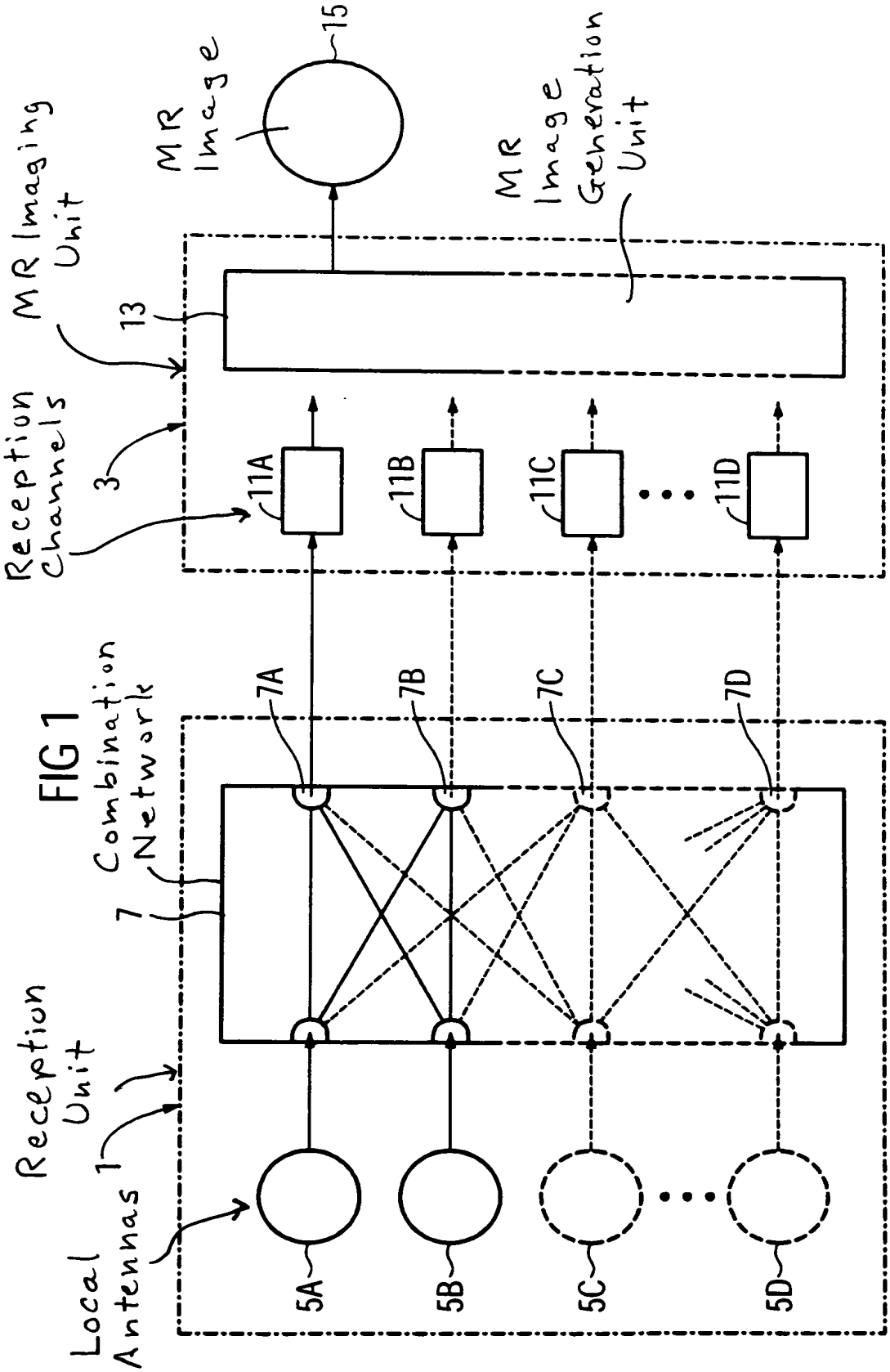

MR Image
15
MR Image Generation Unit
MR Imaging Unit
13
Reception Channels
3
11A
11B
11C
11D
7A
7B
7C
7D
Combination Network
7
Reception Unit
1
Local Antennas
5A
5B
5C
5D

FIG 1

FIG 2

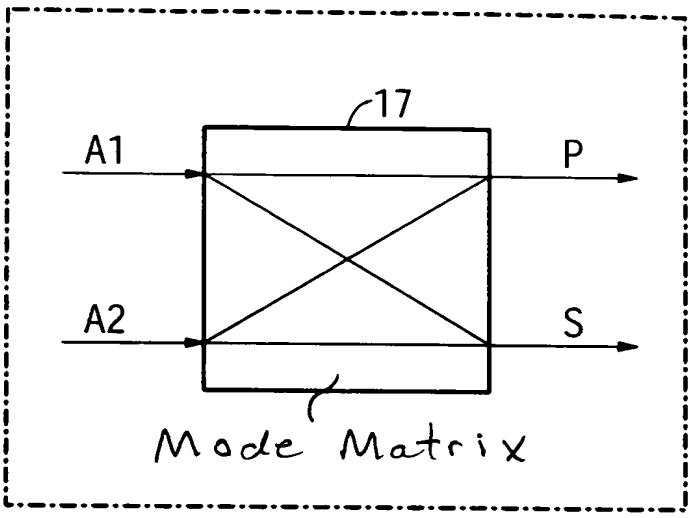
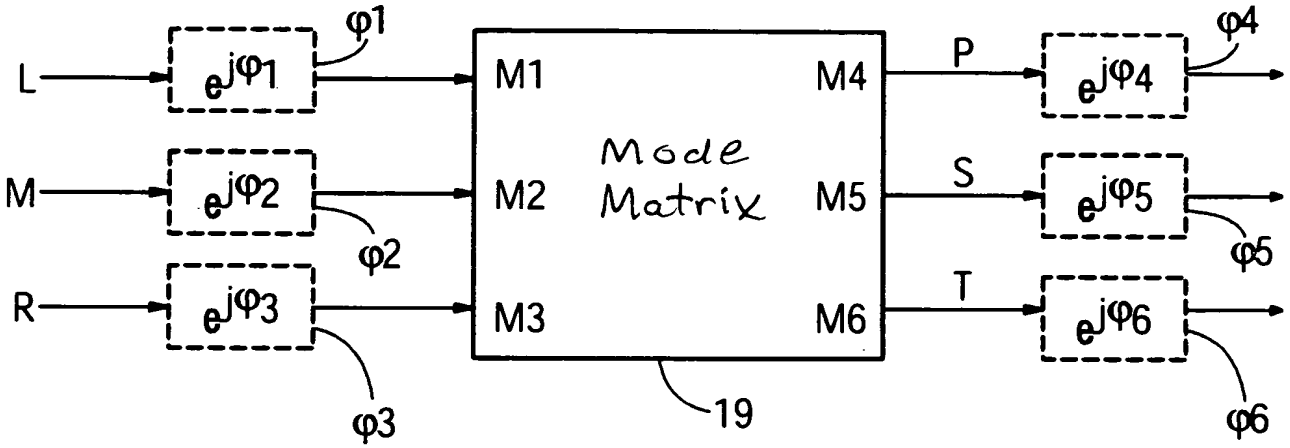

17
A1
A2
P
S
Mode Matrix

FIG 3


L
M
R
$e^{j\varphi 1}$
$e^{j\varphi 2}$
$e^{j\varphi 3}$
φ1
φ2
φ3
M1
M2
M3
Mode Matrix
M4
M5
M6
19
P
S
T
$e^{j\varphi 4}$
$e^{j\varphi 5}$
$e^{j\varphi 6}$
φ4
φ5
φ6

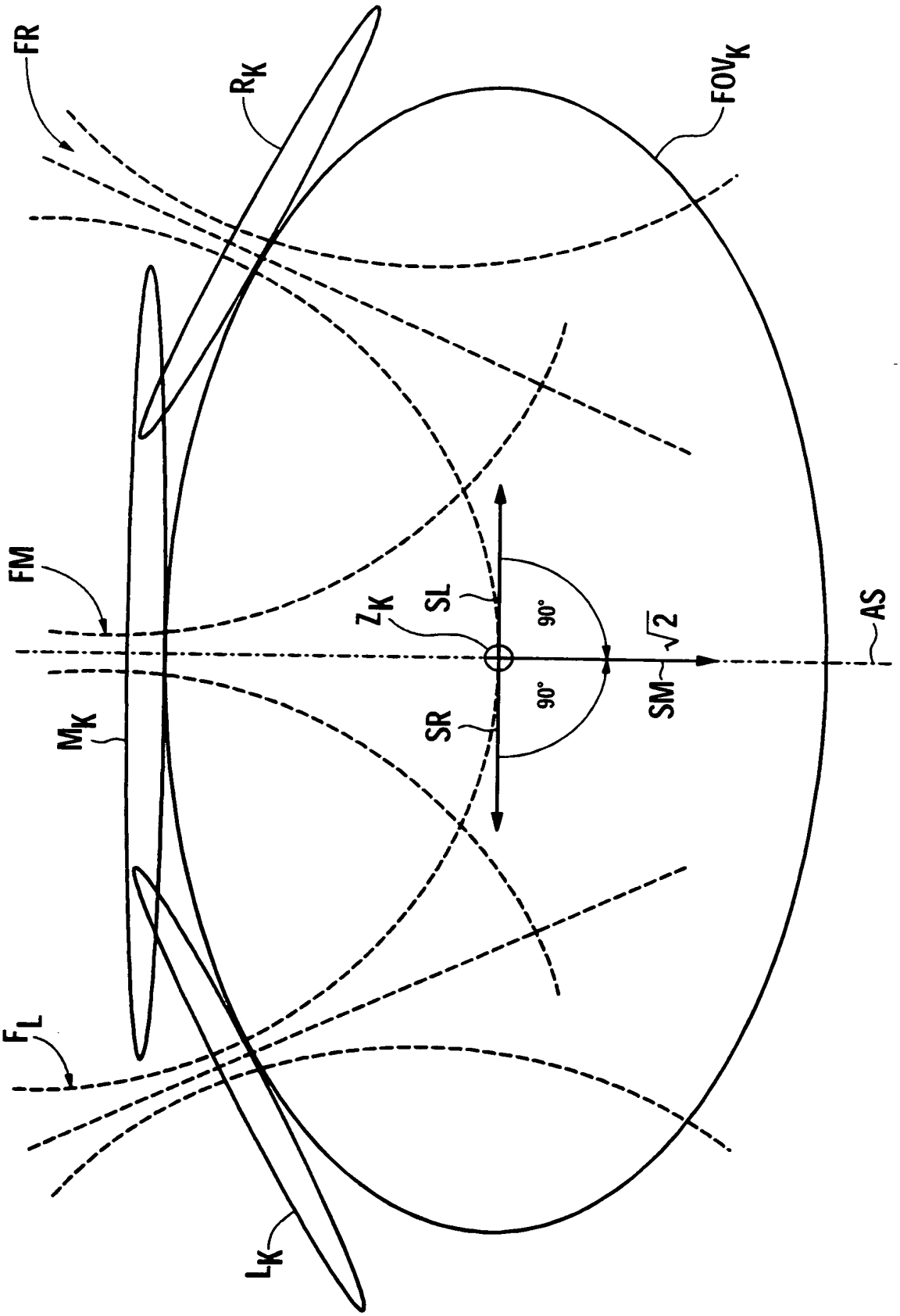



FIG 4

FIG 5A

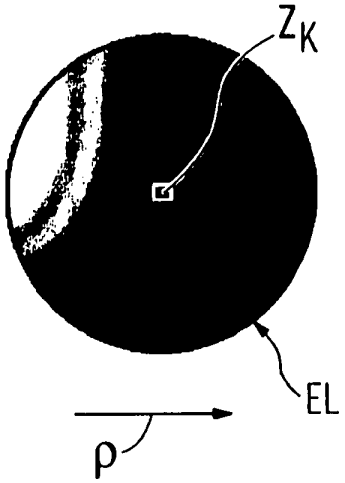



FIG 5B

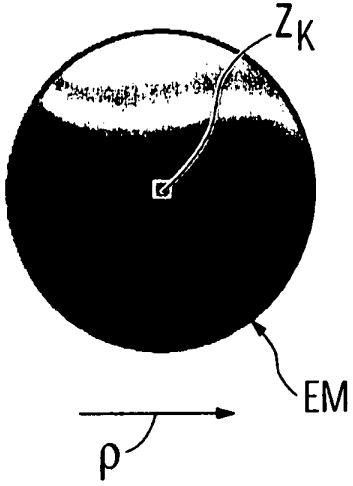



FIG 5C

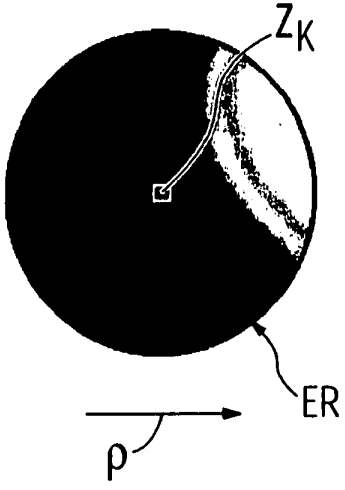



FIG 6A

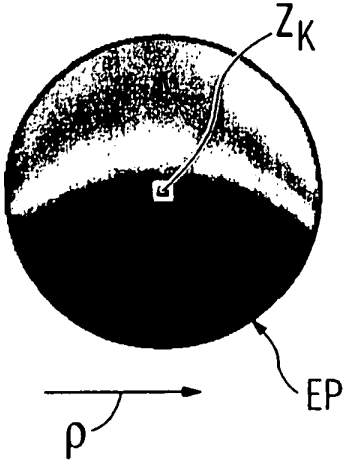



FIG 6B

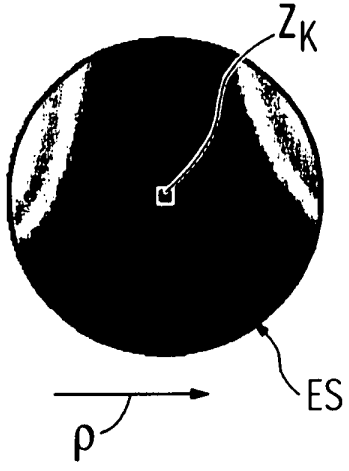



FIG 6C

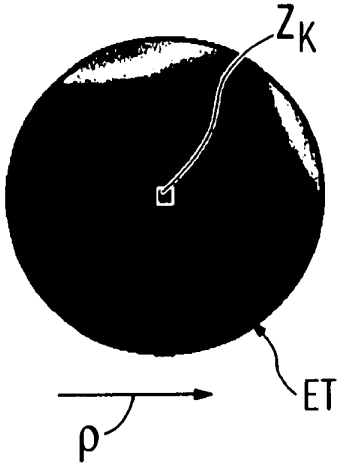


FIG 6D

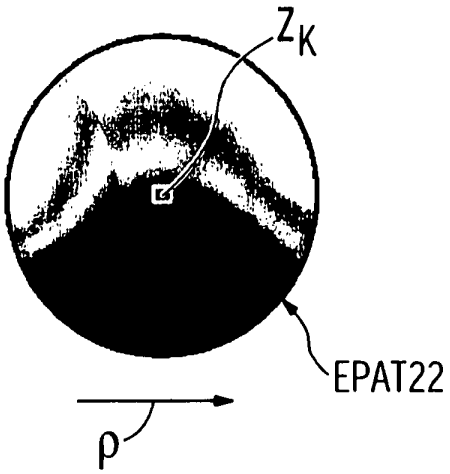



FIG 6E

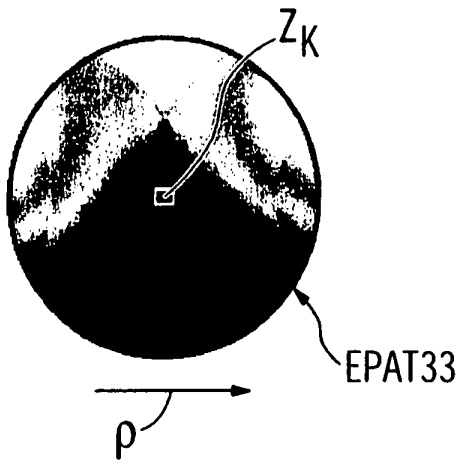



FIG 6F

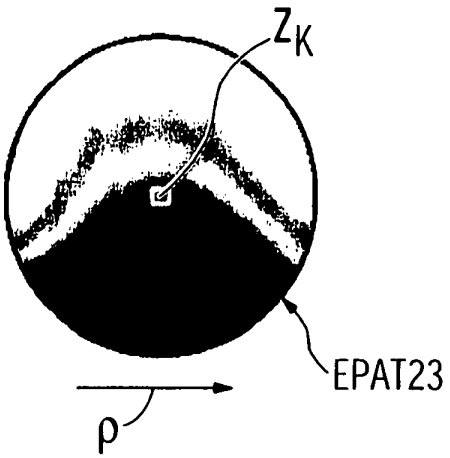



FIG 6G

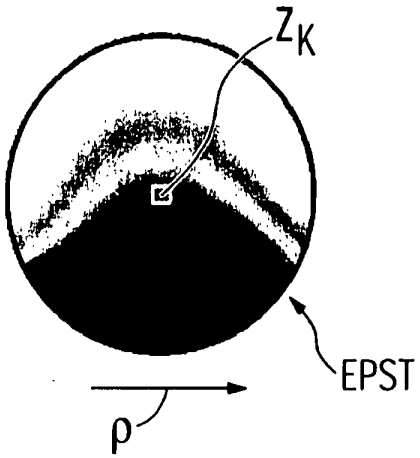


FIG 7

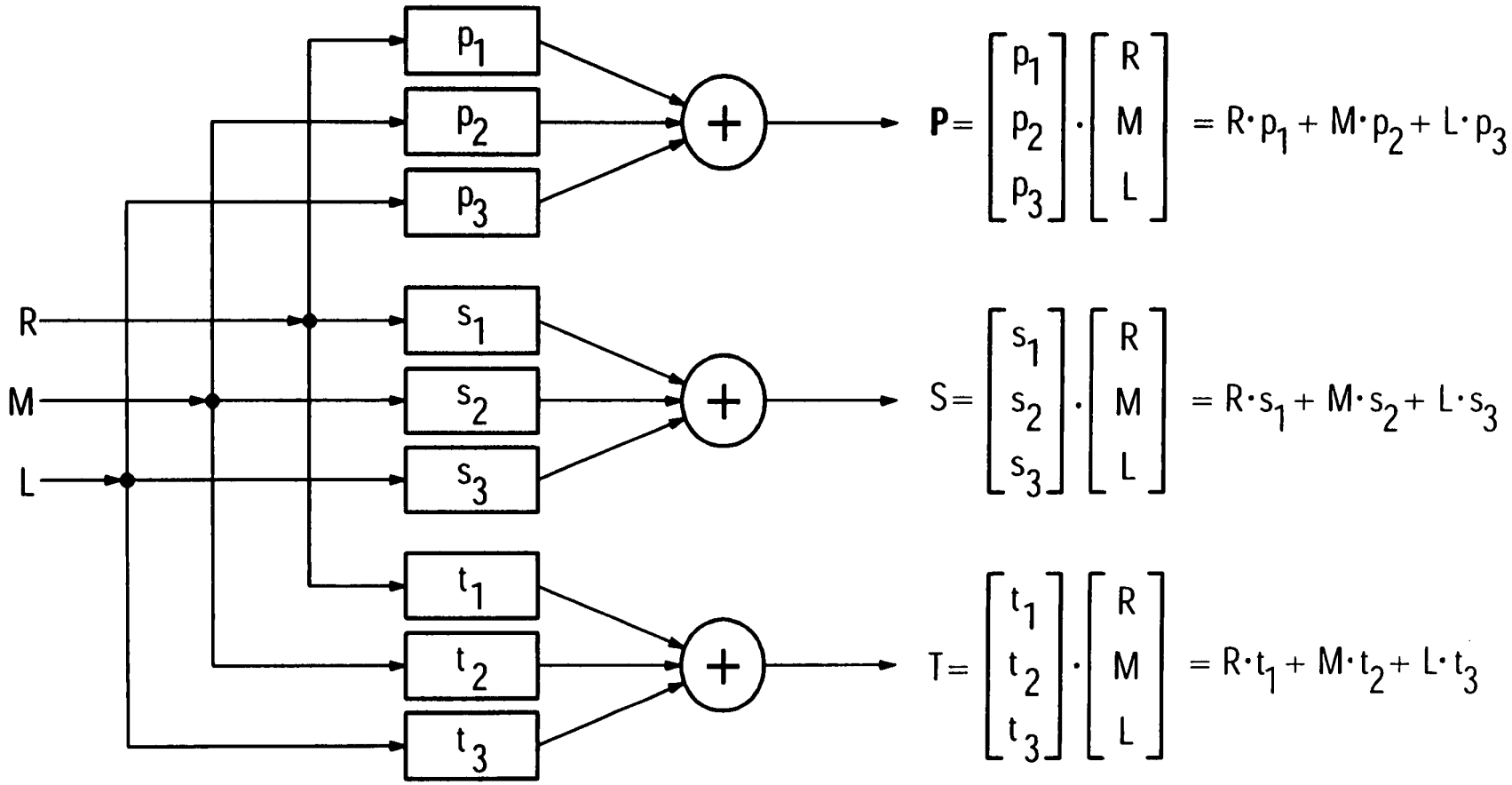

R
M
L
p1
p2
p3
s1
s2
s3
t1
t2
t3
+
+
+
P= [p1 p2 p3] · [R M L] = R·p1 + M·p2 + L·p3
S= [s1 s2 s3] · [R M L] = R·s1 + M·s2 + L·s3
T= [t1 t2 t3] · [R M L] = R·t1 + M·t2 + L·t3

FIG 8

$$\begin{bmatrix} P \\ S \\ T \end{bmatrix} = \begin{bmatrix} p_1 & p_2 & p_3 \\ s_1 & s_2 & s_3 \\ t_1 & t_2 & t_3 \end{bmatrix} \cdot \begin{bmatrix} R \\ M \\ L \end{bmatrix} = \begin{bmatrix} p_1 & p_2 & p_3 \\ s_1 & s_2 & s_3 \\ t_1 & t_2 & t_3 \end{bmatrix} \cdot \mathbf{I}$$

FIG 9

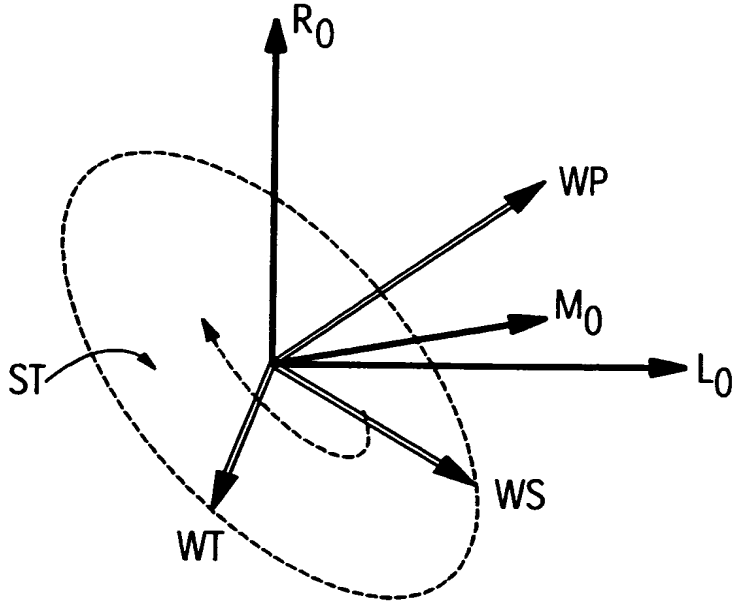


FIG 10

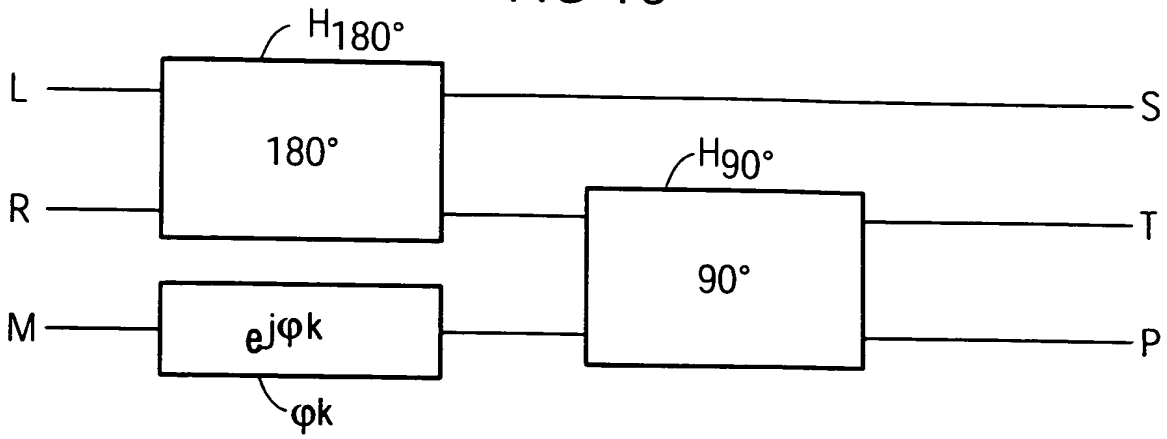



FIG 11

$$\begin{bmatrix} P \\ S \\ T \end{bmatrix} = \begin{bmatrix} \frac{1}{2} & -\frac{j}{\sqrt{2}} & -\frac{1}{2} \\ \frac{1}{\sqrt{2}} & 0 & \frac{1}{\sqrt{2}} \\ \frac{1}{2} & \frac{j}{\sqrt{2}} & -\frac{1}{2} \end{bmatrix} \cdot \begin{bmatrix} R \\ M \\ L \end{bmatrix}$$

FIG 12

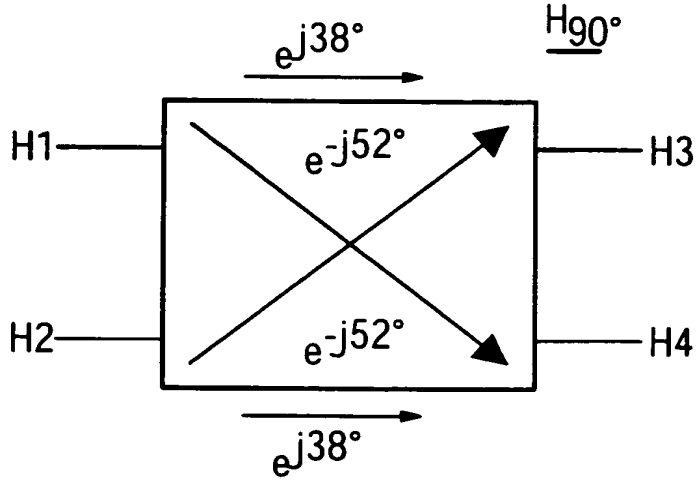


FIG 13

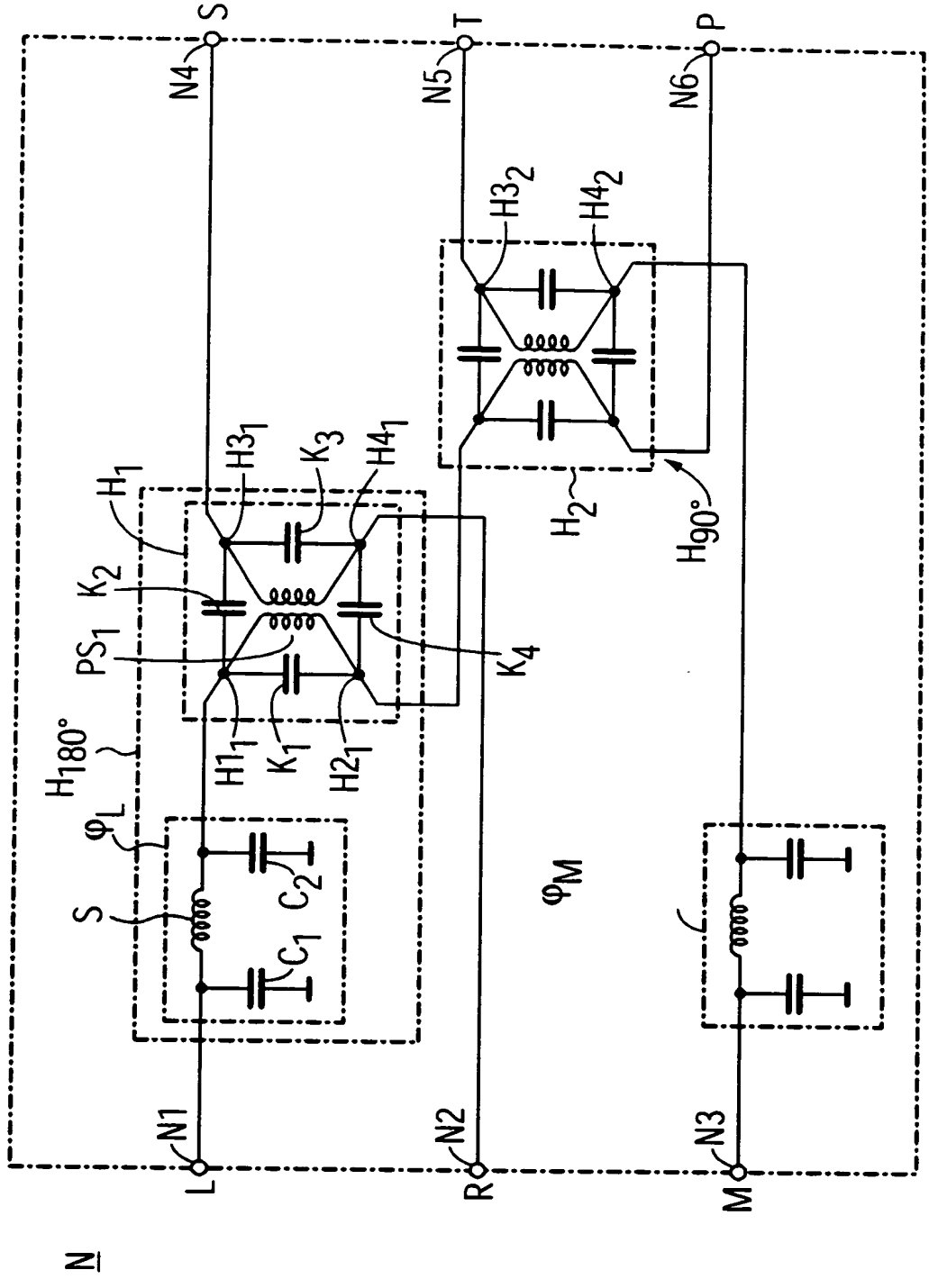

N
S
T
P
N4
N5
N6
H3₂
H4₂
H1
H3₁
K3
H4₁
K2
PS1
K4
H2
H90°
H180°
H1₁
K1
H2₁
φL
S
C2
C1
φM
N1
N2
N3
L
R
M

FIG 14

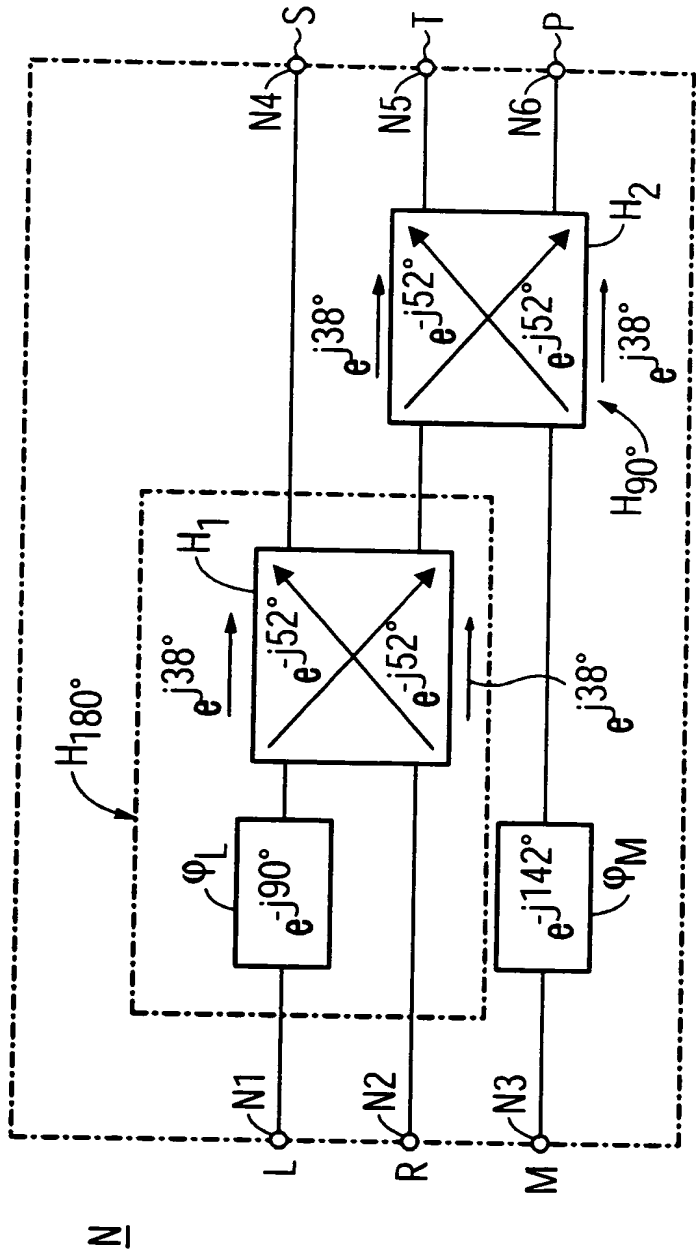

N
L
R
M
N1
N2
N3
N4
N5
N6
S
T
P
$H_{180°}$
$H_1$
$H_2$
$H_{90°}$
$\varphi_L$
$\varphi_M$
$e^{-j90°}$
$e^{j142°}$
$e^{j38°}$
$e^{-j52°}$

FIG 15

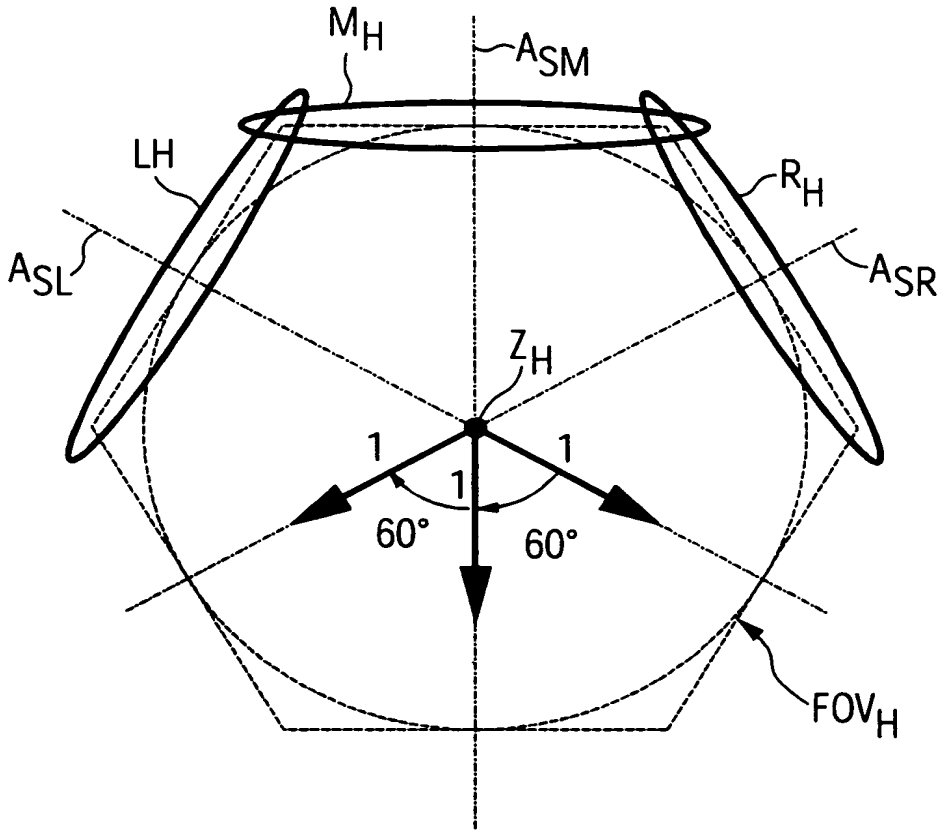


FIG 16

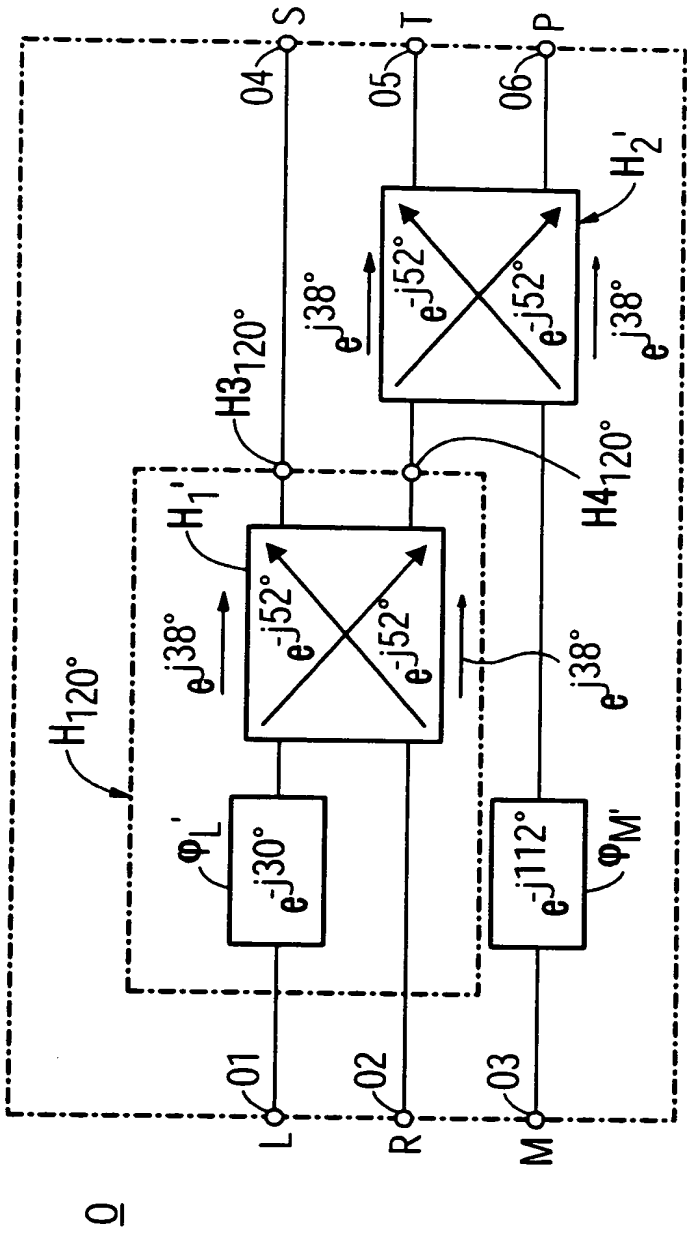

0
L
R
M
S
T
P
01
02
03
04
05
06
H120°
H1'
H2'
H3120°
H4120°
φL'
φM'
e-j30°
e-j112°
e-j52°
ej38°

FIG 17

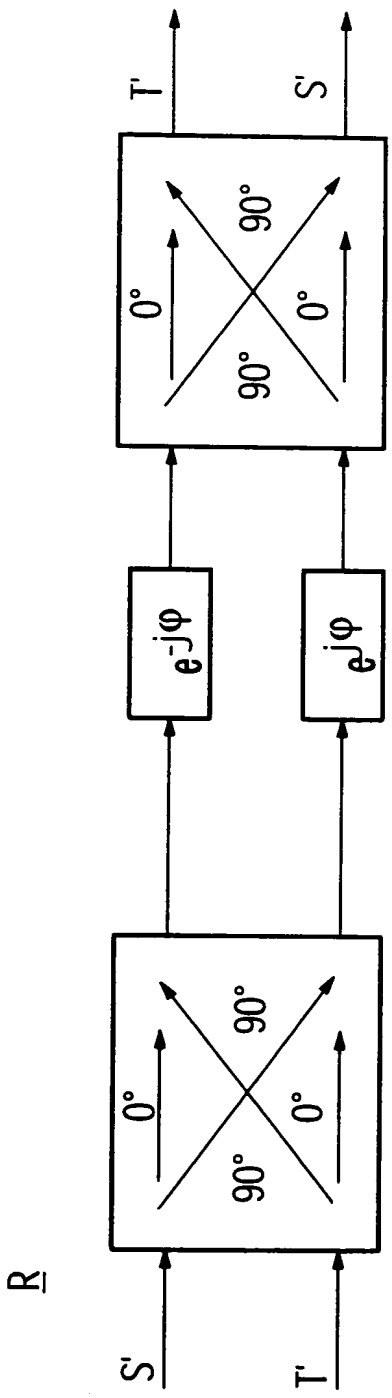


FIG 18

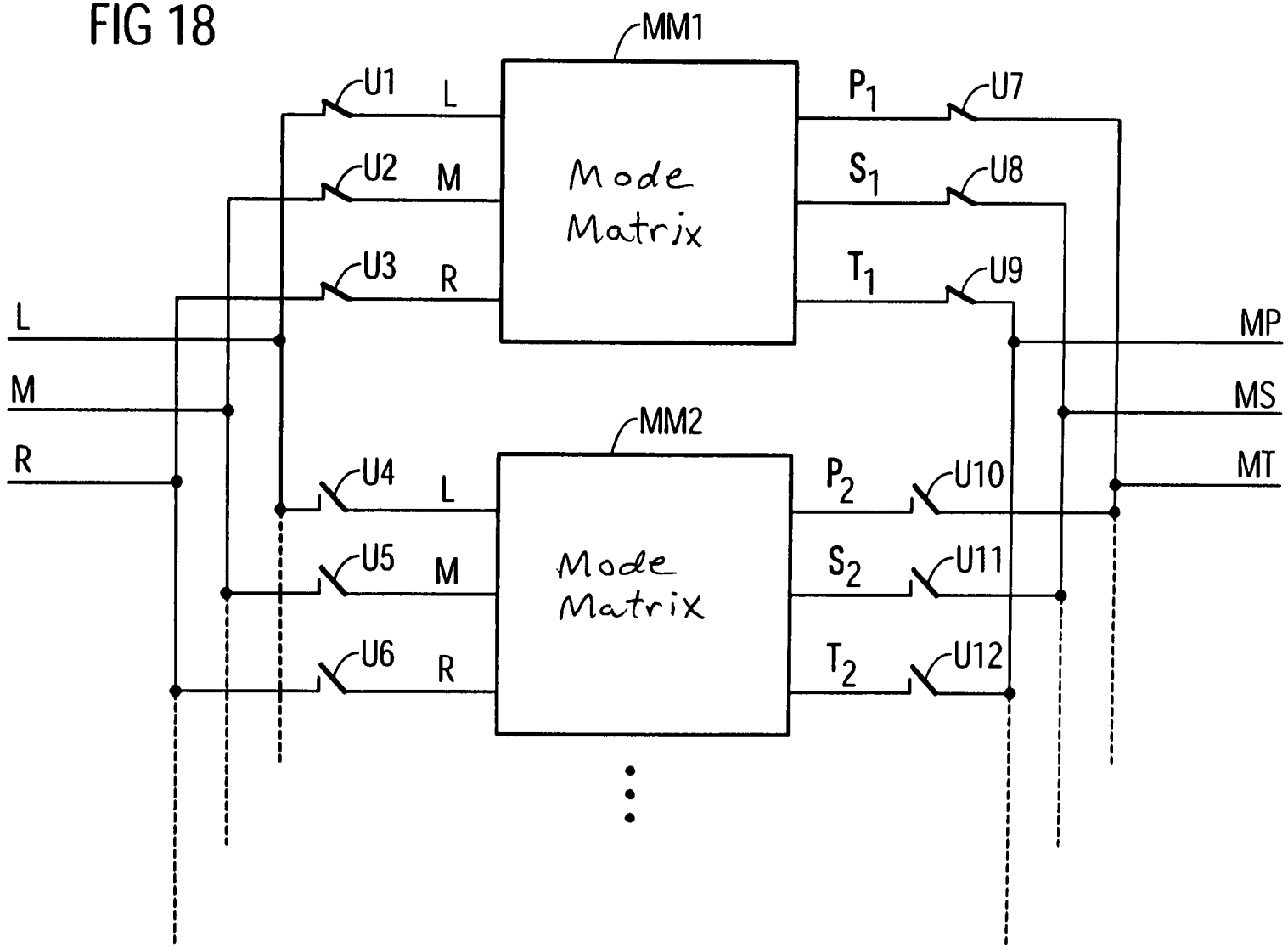

MM1
U1
L
U2
M
U3
R
Mode Matrix
P1
U7
S1
U8
T1
U9
L
M
R
MP
MS
MT
MM2
U4
L
U5
M
U6
R
Mode Matrix
P2
U10
S2
U11
T2
U12

FIG 19

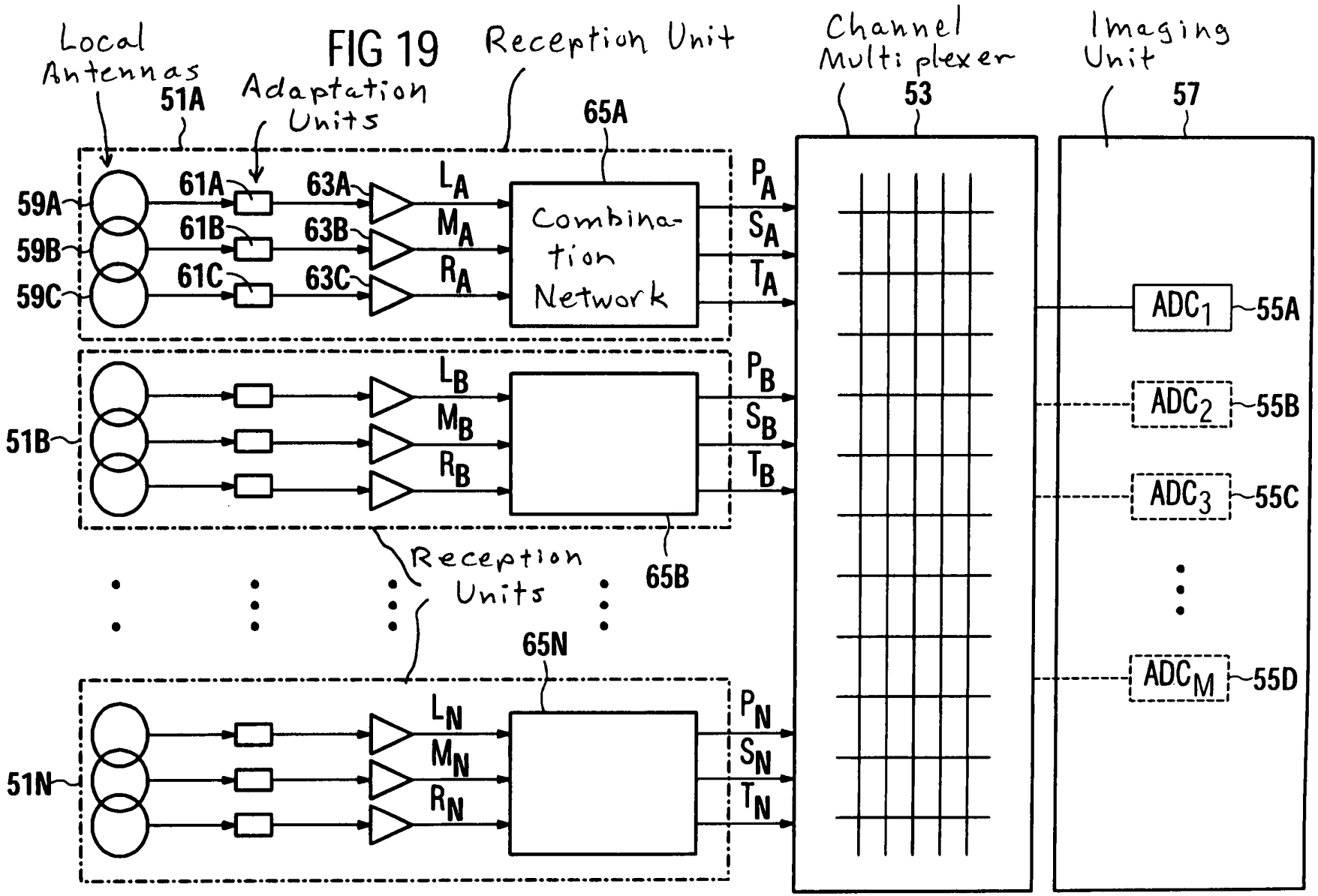
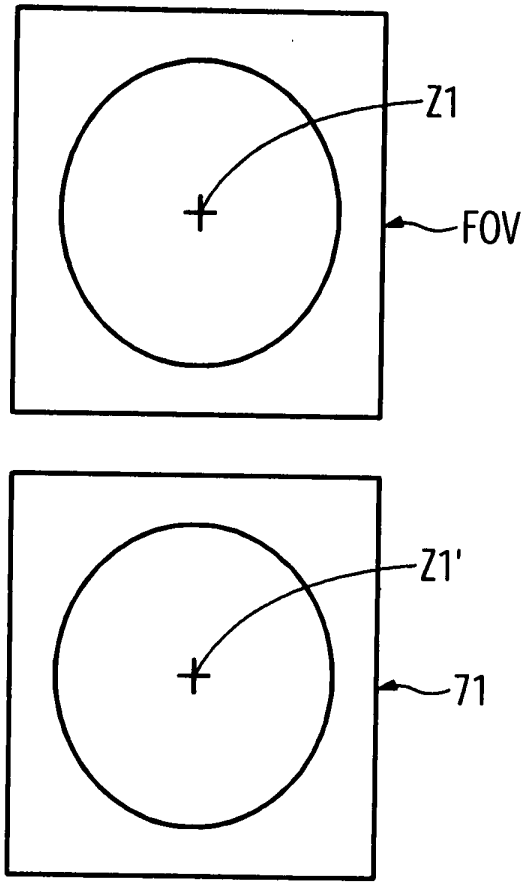

Local Antennas
51A
Adaptation Units
Reception Unit
65A
Channel Multiplexer
53
Imaging Unit
57
59A
59B
59C
61A
61B
61C
63A
63B
63C
$L_A$
$M_A$
$R_A$
Combination Network
$P_A$
$S_A$
$T_A$
$ADC_1$
55A
$ADC_2$
55B
$ADC_3$
55C
$ADC_M$
55D
51B
$L_B$
$M_B$
$R_B$
$P_B$
$S_B$
$T_B$
65B
Reception Units
65N
51N
$L_N$
$M_N$
$R_N$
$P_N$
$S_N$
$T_N$

FIG 20



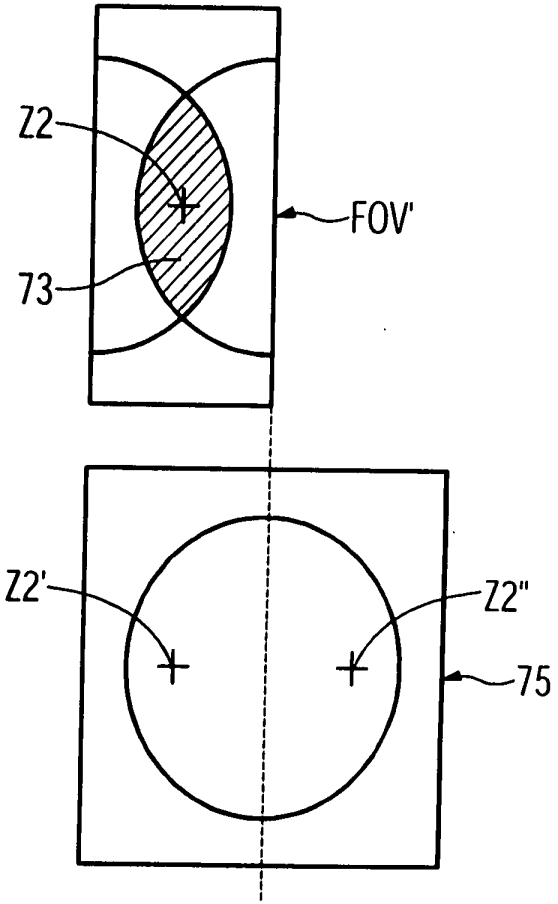


FIG 21